Space Weather Forecast

Issued on Wednesday, 18 January 2023 at 13:02 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Minor/Moderate Radio Blackouts likely. G1/Minor Geomagnetic Storms likely Days 1 and 2 (18-19 Jan), risk declining later in the period.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate over the past 24 hours, with a couple of Moderate-class flares, both originating from the largest and most complex region on the disc in the southeast. There is also a large region in the northeast which retains some magnetic complexity. The remaining seven regions appear stable for now with some regions showing signs of fading. No new Earth-directed CMEs have been observed in available coronagraph imagery.

Solar Wind / Geomagnetic Activity: The solar wind showed a gradual decline to slow levels, before a coronal mass ejection (CME) arrived at 17/2115 UTC. Wind speeds were slightly elevated to start, becoming slow, before jumping back to slightly elevated, peaking at around 490 km/s due to the arrival of the CME. The Interplanetary Magnetic Field was weak, but became moderate with the CME arrival. The north-south component varied weakly, but became moderately southward directed after the CME arrived. Geomagnetic activity was Quiet to Unsettled, with Active intervals between 18/0000-0300 UTC and 18/0300-0600 UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be moderate, with a slight chance of reaching high levels, with two large and complex sunspot regions on the visible disc.

Solar Wind / Geomagnetic Activity: The arrival of a CME overnight has increased geomagnetic activity at Earth, with effects from this likely to last through much of Day 1 (18 Jan). A second CME that was launched on 14 January may also give a glancing blow either late on Day 1 or early on Day 2 (19 Jan). In addition, two small coronal holes may give some weak fast wind influence late Day 1 into early Day 2 with wind speeds up to around 500 km/s. A further fast wind is possible during Day 3 (20 Jan).

Geomagnetic activity is expected to often be Unsettled to Active with G1/Minor Storm intervals likely on Days 1 and 2, the risk declining slightly during Days 3 and 4.

Energetic Particles / Solar Radiation: Solar radiation will most likely remain at background levels, but with a slight chance of enhancements to S1 or greater through the period, in association with any larger flares.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	70	50	40	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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